2.5 / 29, 33, 35, 43, 45
2.6 / 13-16

2.6/15 $\lim_{x\to+\infty} \sin\left(\frac{\pi x}{2-3x}\right)$

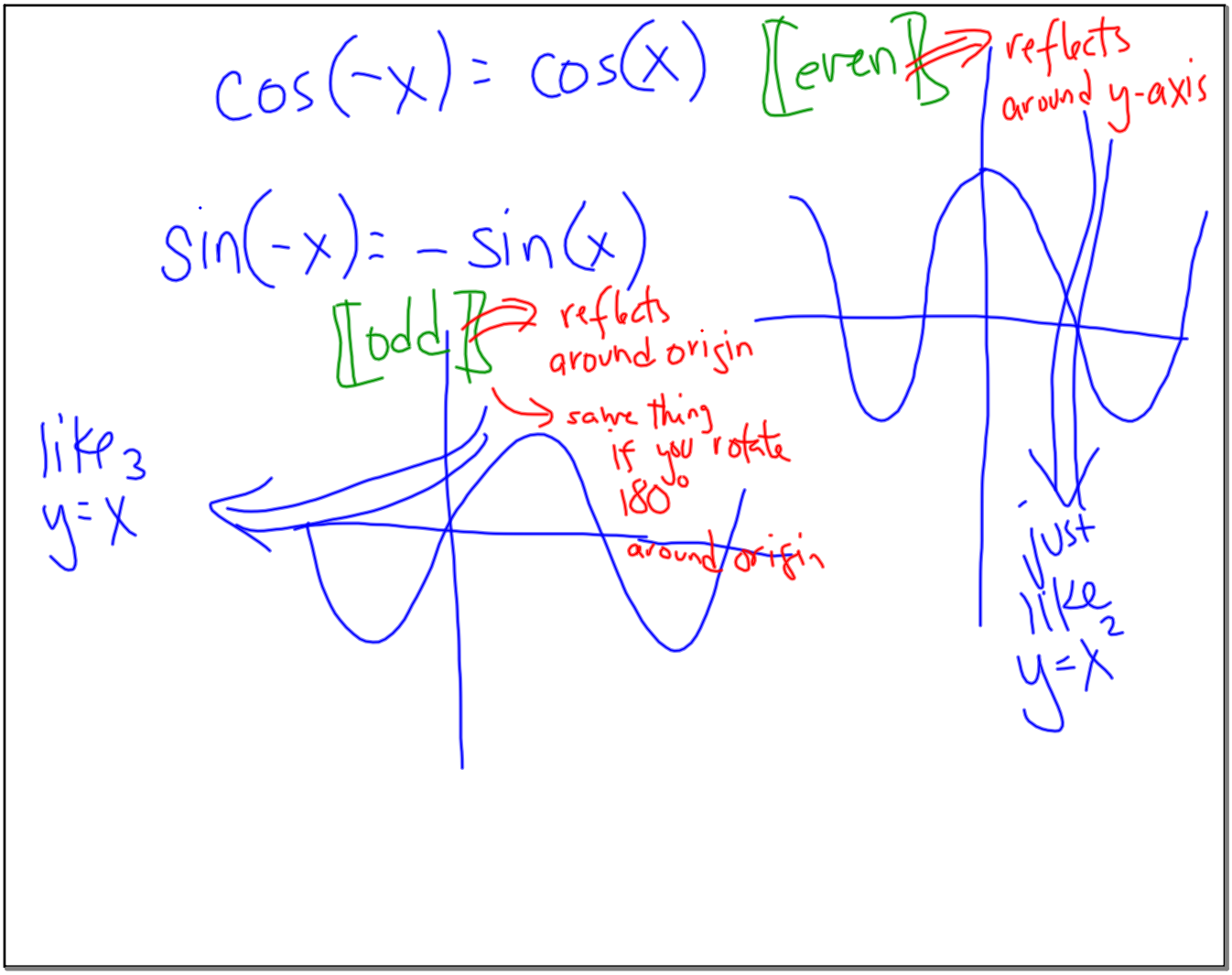
$= \sin\left(\lim_{x\to+\infty} \frac{\pi x}{2-3x}\right) = \sin\left(\lim_{x\to\infty} \frac{x}{x}\cdot\left(\frac{\pi}{\frac{2}{x}-3}\right)\right)$

$= \sin\left(\lim_{x\to+\infty} \frac{\pi}{\frac{2}{x}-3}\right) = \sin\left(-\frac{\pi}{3}\right)$

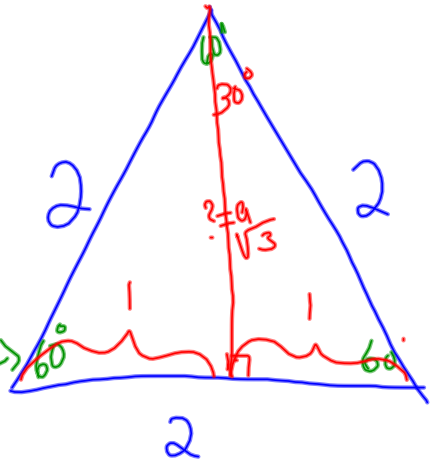
$= \sin(-60^\circ) = -\frac{\sqrt{3}}{2}$

KNO principal trig. ratios of special angles

$\frac{\pi}{3}$ radians $= \frac{180}{3}$ degrees


cos(-x) = cos(x)
[even] reflects around y-axis
sin(-x) = -sin(x)
[odd] reflects around origin
same thing if you rotate 180° around origin
like y = x³
just like y = x²

$30^\circ - 60^\circ - 90^\circ$ $\triangle$



$a^2 + 1^2 = 2^2$

$a^2 = 4 - 1 = 3$

$a = \sqrt{3}$

$\frac{\pi}{3}$ radians

$\sin(\alpha) = \cos(90^\circ - \alpha)$

$[\![0 \le \alpha \le 90^\circ]\!]$

$\sin 30^\circ = \frac{1}{2}$ $\quad \cos 30^\circ = \frac{\sqrt{3}}{2}$

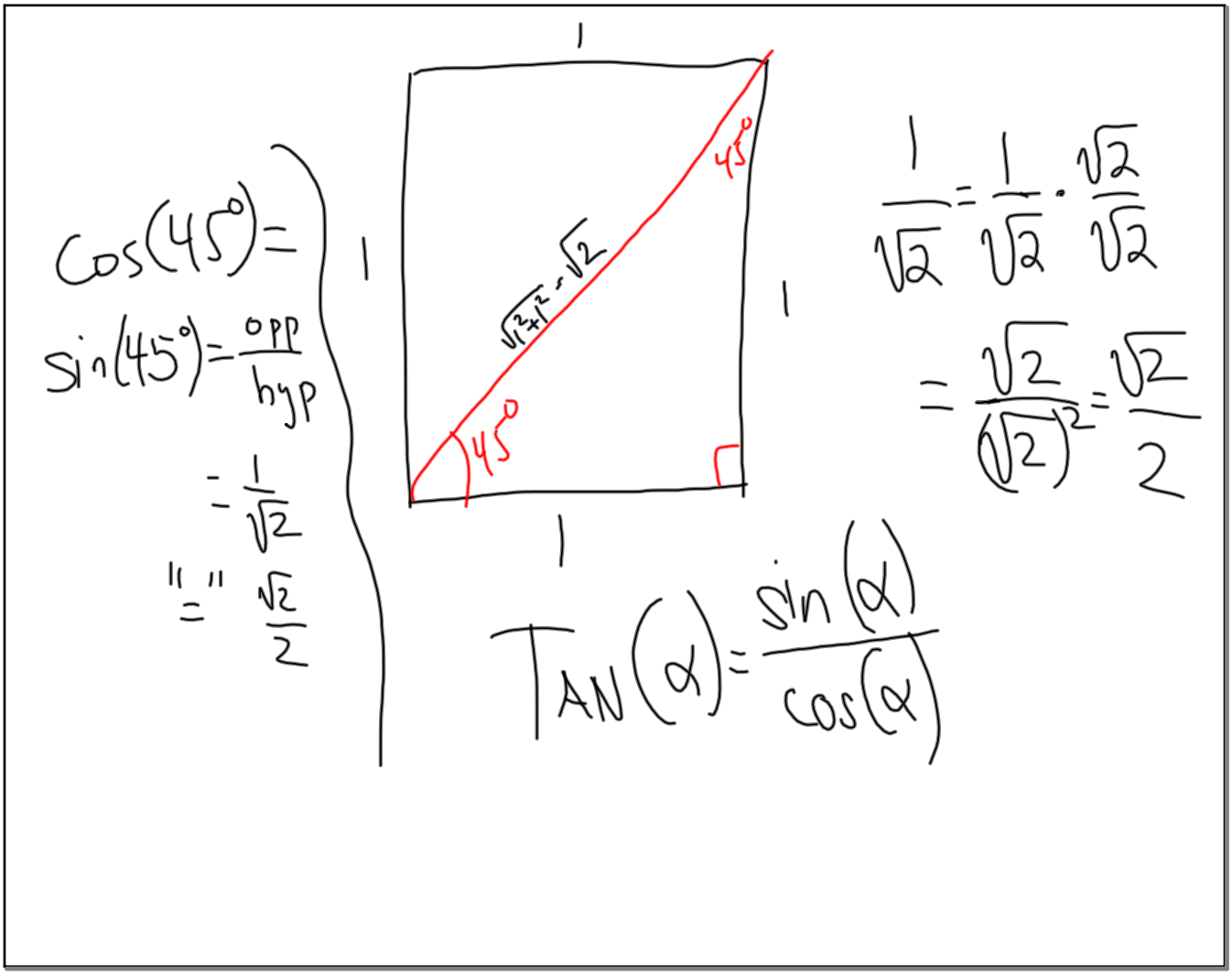
$\sin 60^\circ = \frac{\sqrt{3}}{2}$ $\quad \cos 60^\circ = \frac{1}{2}$

SohCahToa

Sine - opposite over hypotenuse

Cosine - adjacent over hypotenuse

Tangent - opposite over adjacent


1
1
1
45°
45°
$\sqrt{1^2+1^2}=\sqrt{2}$
$\cos(45^\circ)=$
$\sin(45^\circ)=\frac{opp}{hyp}$
$=\frac{1}{\sqrt{2}}$
$=\frac{\sqrt{2}}{2}$
$\frac{1}{\sqrt{2}}=\frac{1}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}$
$=\frac{\sqrt{2}}{(\sqrt{2})^2}=\frac{\sqrt{2}}{2}$
$TAN(\alpha)=\frac{\sin(\alpha)}{\cos(\alpha)}$

Sep 17-7:25 AM

2.6/16 Recall $\lim_{x\to 0} \frac{\sin x}{x} = 1$ ARGH! but only if x is in radians

[b/c you are supposed to learn this]

$$\lim_{h\to 0} \frac{\sin h}{2h} = \lim_{h\to 0} \frac{1}{2}\left(\frac{\sin h}{h}\right) = \frac{1}{2}\cdot 1 = \frac{1}{2}$$

$\lim_{x \to 0} \frac{\sin x}{x} = 1$ [[x in radians]]

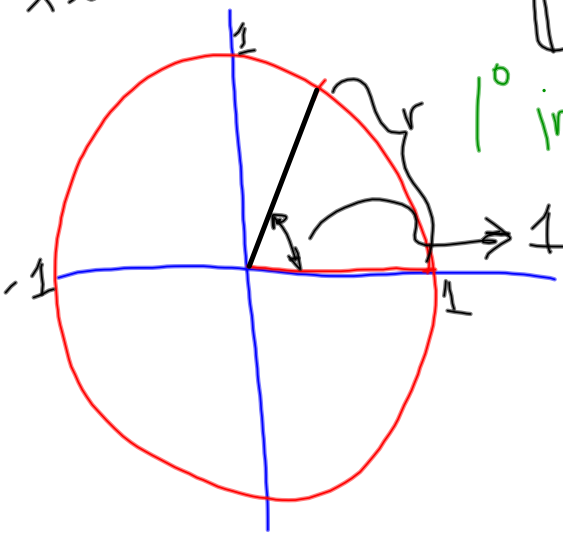
Circles

$\lim_{x \to 0} \frac{\sin x}{x} = \frac{2\pi}{360} = .0174532\ldots \approx$ [[x in degrees]]

$A = \pi r^2$

$C = \pi d$

$= 2\pi r$

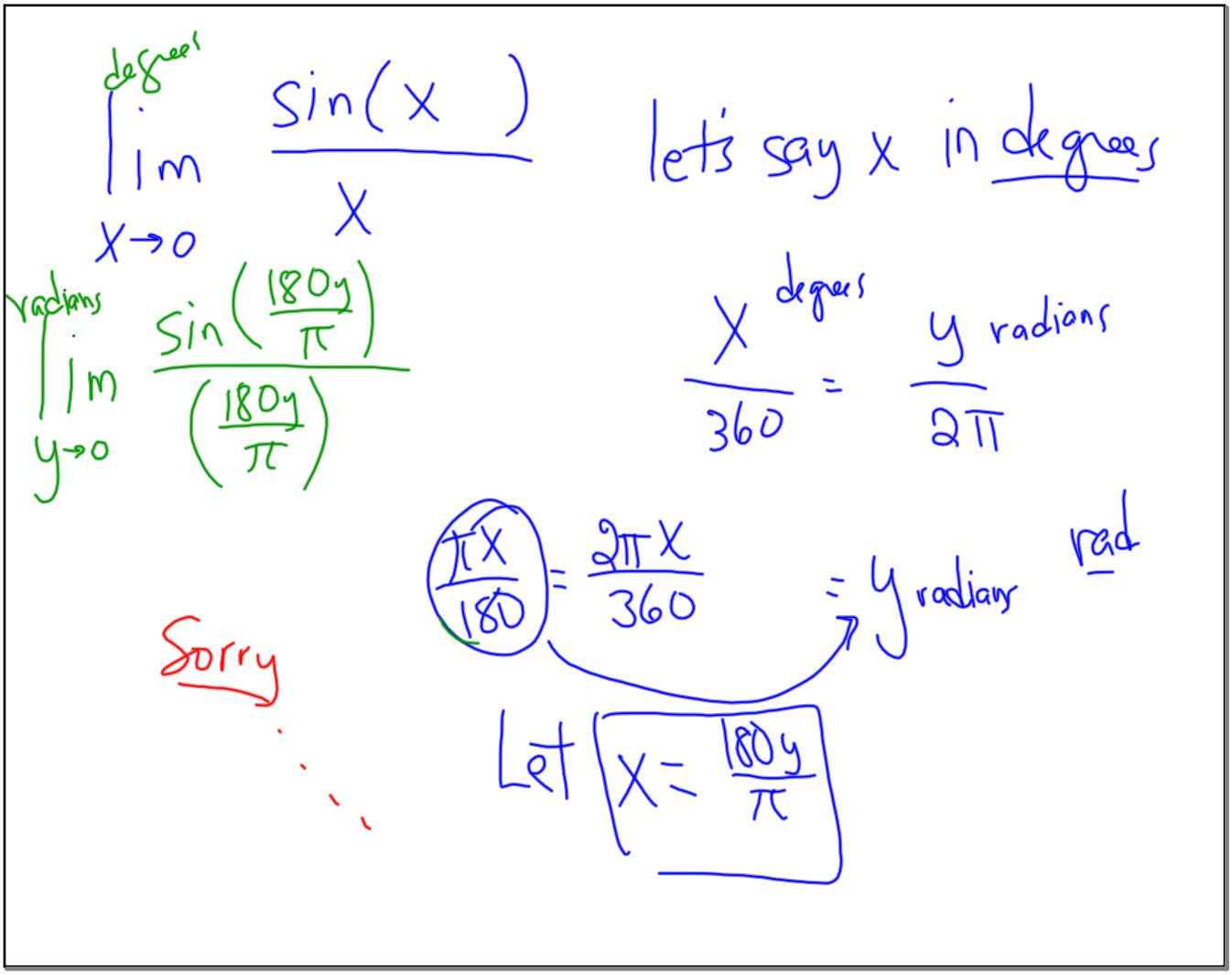


1° in radians

1 RADIUS ANGLE

"1 circle" $= \frac{360^\circ}{1^\circ} = \frac{2\pi}{x}$ radians.

x radians $= \frac{2\pi \text{ radians}}{360^\circ}$


degrees
lim x→0 sin(x)/x
let's say x in degrees
radians
lim y→0 sin(180y/π) / (180y/π)
x degrees / 360 = y radians / 2π
πx/180 = 2πx/360 = y radians
rad
Sorry . . .
Let x = 180y/π

$$\lim_{x \to 0} 2\left(\frac{\sin(2x)}{2x}\right)$$

$$= (2)(1) = 2$$

$$\lim_{\square \to 0} \frac{\sin(\square)}{\square} = 1$$

Sep 17-8:19 AM

$$\lim_{x\to 0}\frac{\sin(5x)}{2x} = \frac{1}{2}\lim_{x\to 0} 5\left(\frac{\sin(5x)}{5x}\right)$$

$$= \frac{5}{2}\left(\lim_{x\to 0}\frac{\sin(5x)}{5x}\right) = \frac{5}{2}$$

2.5/35) f, g, discontinuous

$f(x) = g(x) = \begin{cases} 1 & \text{if } x \text{ is rational} \\ 0 & \text{if } x \text{ is irrational} \end{cases}$

$h(x) = \begin{cases} 0 & \text{if } x \text{ is rational} \\ 1 & \text{if } x \text{ is irrational} \end{cases}$

$f + g \to$ Continuous or not?

$\begin{cases} 2 & \text{if } x \text{ is rational} \\ 0 & \text{if not} \end{cases}$

Disc

$f + h \to$ cont or not?

$(f+h)(x) = \begin{cases} 1 & \text{if } x \text{ is rational} \\ 1 & \text{if } x \text{ is irrational} \end{cases}$